REMARKS

Claims 1-28 are now pending in the application. Claims 1, 10, 14, and 18 have been amended. No claims have been canceled or added. Applicants respectfully request reconsideration and examination in view of the following remarks.

Specification

The Office Action requested correction of any errors that Applicants become aware of in the specification. Applicants have complied with the request as demonstrated by the amendments to the specification, claims, and drawings described above.

Claim Rejections 35 U.S.C. 102

Claims 1-4, 10-13, and 18-22 were rejected under 35 U.S.C. 102(e) as being anticipated by Szita (U.S. Patent 6,608,731, hereinafter 'Szita'). Applicants respectfully disagree and submit that Szita does not teach each and every feature of Applicants' claimed invention as recited in amended independent claims 1, 10, and 18. Applicants claimed invention is directed to a system and method for compensating disturbances that cause track shape irregularities on a disc during a disc servo-writing process performed by a servo-writer. The disturbances, substantially attributable to a nonrepeatable runout (NRRO), are present during the servo-writing process. A substantial component of the NRRO is a cage frequency generated by a motor supporting the disc. A reference cage frequency is determined during a servo-writing process by using a position sensor. Then a feed-forward input signal is determined based at least on the reference cage frequency during the servo-writing process. In addition, the feed-forward input signal is feed-forwardly transmitted to the servo-writer. In the servo-writer, the feed-forward input signal is utilized to substantially reject disturbances that cause the track shape irregularities while the servo-writing head electrically connected to the servo-writer is writing servo patterns on a user track during the servo-writing process.

Applicants claimed invention addresses both track squeeze errors and track closure errors by compensating for cage frequency. A track closure error denotes a type of track shape imperfection that is also caused by external disturbances (such as, noise, spindle wobble, disc slip, changing fly height, and thermal expansion, etc.). The track closure error occurs when the servo-writer writes a spiral-shaped track with a large radial discontinuity at the splice point

(evidenced by a position error signal (PES) splice) instead of a circular track with no radial discontinuity at any point. The track closure error unless eliminated causes servo off-track failures during normal drive operations.

In contrast, Szita teaches eliminating the growth of existing track shape errors during self-propagating servo track writing. Thus, Szita does not teach using a servo-writer performing a servo-writing process, because the servo track writing taught in Szita is self propagating and done without the use of a dedicated servo-writer and reference head. (See Szita, column 5, line 12). Szita teaches eliminating relative and absolute track shape errors by writing Zero Acceleration Path ("ZAP") correction factors into the servo sectors during track propagation. ZAP correction, as taught in Szita, may be used to minimize track position inaccuracies due to track-squeeze-type-errors after tracks are written on a disc. The basic idea of the ZAP correction is to add appropriate correction factors to the measured head position at each servo sector on a track already written on a disc. The correction factors are typically determined during or after the servo-writing process. The determined correction factors are then written back in each servo sector on the disc, usually in a dedicated field for storing the correction factors. The stored correction factors cancel all written-in track squeeze errors and allow a head to follow an improved shape of the modified track. Thus, the errors are still present on the disc and are not eliminated.

The ZAP correction cannot remedy a large track discontinuity that causes a track closure error. That is, the ZAP correction cannot effectively learn and compensate for track closure error, because the position error (measured by the PES values) at the splice point where a large radial discontinuity is present is too large for the ZAP correction to effectively remove the error. (See Szita, column 11, line 24-25 and 49-54; column 12, lines 52-55).

Applicants claimed invention as recited in amended independent claim 1 is drawn to a method of compensating for disturbances that cause track shape irregularities on a disc during a disc servo-writing process, the disturbances substantially attributable to a nonrepeatable runout (NRRO) substantially caused by a cage frequency generated in a motor supporting the disc. The method recites, among other features, (1) determining a reference cage frequency, (2) determining a feed-forward input signal based on the reference cage frequency, and (3) feed-forwardly applying the feed-forward input signal to the servo-writer to substantially eliminate the

track shape irregularities as track servo patterns are written by a servo-writing head operably connected to the servo-writer.

The Office Action asserts that Szita teaches a servo writer that performs the servo-writing process and means for determining a feed-forward input signal for the servo-writer based on a reference cage frequency. The Office Action cites column 8, lines 19-36, 50-66, and Fig. 13 of Sizta in support of the assertion. Applicants respectfully submit that column 8, line 21 and Fig. 13 of Sitza illustrate that ZAP correction adds correction factors that cancel "written-in-errors". In contrast, Applicants' claimed invention, as recited in claim 1, determines and feed-forwardly applies a feed-forward input signal based on the reference cage frequency before an error is written in the disc. Secondly, column 8, line 34 states that ZAP correction factors can be used to cancel track shape irregularities identified as "repeatable disturbances" and not NRRO as recited in Applicants' amended claim 1.

Further, the non-repeatable position disturbance 'd', identified in Fig. 3 and in the table of lines 55-66 of column 8 in Szita, is not improved by ZAP correction. ZAP correction only removes the influence of d in calculations by repeatedly averaging the estimated track shape. Thus, because the effects of d are already written in the disc, Szita cannot teach (3) feed-forwardly applying the feed-forward input signal to the servo-writer to substantially eliminate the track shape irregularities as track servo patterns are written by a servo-writing head operably connected to the servo-writer as recited in Applicants' amended claim 1. (See Szita column 12 lines 30-31, 52-67. Szita does not teach or suggest determining a reference cage frequency anywhere in the reference. The only way for Szita to determine an accurate track shape error is to remove the already written-in effects of non-repeatable 'd' from calculations. (See Szita, column 13, lines 36-40.) Thus, Szita cannot correct for NRRO and Applicants' amended claim 1 is allowable over Szita. (See also U.S. Patent 6,411,461, also to Szita, stating that ZAP correction solely addresses 'repeatable' runout while neglecting NRRO. Column 1, lines 14-15, 65-67, and column 2, lines 25-35).

At least because claims 2-4 incorporate the features of amended independent claim 1, claims 2-4 are also allowable over Szita. Applicants respectfully request that the rejection of claims 1-4 be allowed.

With regard to amended independent claim 10 and as described above with regard to amended claim 1, Szita cannot teach a disturbance removal system for compensating for

disturbances that cause track shape irregularities on a disc during a disc servo-writing process performed by a servo-writer moving a servo-writing head, the disturbances attributable to a non-repeatable runout (NRRO) substantially caused by a cage frequency generated in a motor supporting the disc. Sizta cannot directly measure the relative position of the disc and the read/write head. Szita must use previous tracks to estimate the relative position, thereby being influenced by irregularities in previously written tracks. (See column 9, lines 52-65). Thus, Szita does not teach (1) a reference position sensor, (2) a reference cage frequency determination module electrically connected to the reference position sensor, (3) a feed-forward input signal determination module connected to the reference cage frequency determination module, determining a feed-forward input signal based on the reference cage frequency, and (4) a servo-writing module receiving the feed-forward input signal from the feed-forward input signal determination module, while the servo-writing head electrically connected to the servo-writing module is writing servo patterns on the disc during the servo-writing process. Having a reference position sensor for use in determining a reference cage frequency cannot be found anywhere in Szita. Thus, Applicants' amended claim 10 is allowable over Szita.

At least because claims 11-13 incorporate the features of amended independent claim 10, claims 11-13 are also allowable over Szita. Thus, Applicants respectfully request that claims 10-13 be allowed.

Similarly, with regard to amended independent claim 18, Szita cannot teach each and every feature as recited in amended claim 18. At least for the reasons described above with regard to amended claims 1 and 10, Szita does not teach or suggest a means for determining a feed-forward input signal for a servo-writer based on a reference cage frequency as recited in amended claim 18. Thus, Applicants' claim 18 is also allowable over Szita.

At least because claims 19-22 incorporate the features of amended independent claim 18, claims 19-22 are also allowable over Szita. Thus, Applicants respectfully request that claims 18-22 be allowed.

Claim Objections and Allowable Subject Matter

Claims 5-9, 14-17, and 23-28 were objected to as being dependent upon a rejected base claim. Applicants acknowledge and thank the Examiner for the instructions regarding allowable subject matter. However, in view of the above remarks, Applicants respectfully submit that

claims 5-9, 14-17, and 23-28 are now dependent on allowable base claims. Thus, Applicants respectfully request that claims 5-9, 14-17, and 23-28 be allowed.

Conclusion

In view of the above amendments and remarks, Applicant respectfully requests a Notice of Allowance. If the Examiner believes a telephone conference would advance the prosecution of this application, the Examiner is invited to telephone the undersigned at the below-listed telephone number.

Respectfully submitted,

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PATENT TRADEMARK OFFICE

MERCHANT & GOULD P.C.
P.O. Box 2903
Minneapolis, Minnesota 55402-0903
(404) 954-5100

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Murrell W. Blackburn
Reg. No. 50881